

B. Amendments to the Claims

1. (Currently amended) An apparatus comprising:
 - a first optical fiber having a first end;
 - a first collimator having a first end and a second end, said first end of said first collimator connected to said first end of said first optical fiber;
 - a second optical fiber having a first end;
 - a second collimator having a first end and a second end, said first end of said second collimator connected to said first end of second optical fiber;
 - a prism connected to said second end of said first collimator and to said second end of said second collimator; and
 - a substrate ~~securing said prism in optical alignment with said first collimator and said second collimator~~ comprising at least one groove, at least one of said first collimator and said second collimator received in said groove in optical alignment with said prism.
2. (Original) The apparatus of claim 1 wherein said substrate is a precision v-groove chip.
3. (Original) The apparatus of claim 1 wherein said substrate is formed from nickel using a LIGA process.
4. (Original) The apparatus of claim 1 wherein said substrate is precision molded plastic.
5. (Original) The apparatus of claim 1 further comprising an index-matched material connecting said first collimator to said prism.
6. (Original) The apparatus of claim 5 wherein said index-matched material comprises an index-matched adhesive.
7. (Original) The apparatus of claim 1 wherein said prism is molded in place on said substrate from index-matched material.

8. (Currently amended) A method for making a fiber optic U-turn device comprising a first collimator, a first optical fiber, a second collimator, a second optical fiber, a prism, and a substrate comprising at least one groove, comprising the steps of:

connecting said first collimator to said first optical fiber;

connecting said second collimator to said second optical fiber;

placing said first collimator ~~onto~~ into said groove of said substrate;

placing said second collimator onto said substrate in a predetermined orientation relative to said first collimator;

placing said prism onto said substrate in ~~a predetermined orientation relative to~~ optical alignment with said first and second collimators;

connecting said first collimator to said prism; and

connecting said second collimator to said prism.

9. (Original) The method of claim 8 wherein the steps of connecting said first collimator to said prism and connecting said second collimator to said prism comprise using an index matched adhesive to bond said first and second collimators to said prism.

10. (Currently amended) A method for making a fiber optic U-turn device, comprising the steps of:

optically coupling a first collimator to a first optical fiber;

optically coupling a second collimator to a second optical fiber;

placing said first collimator onto a substrate;

placing said second collimator onto said substrate in a predetermined orientation relative to said first collimator; and

forming a prism in-situ on said substrate in optical association with said first collimator and said second collimator.

11. (Original) The method of claim 10 wherein said step of forming said prism comprises using an index-matched material to mold a prism onto said substrate in a predetermined orientation

relative to said first and second collimators such that said first and second collimators become integrally connected to said prism.

12. (Original) A method for making a fiber optic U-turn device, comprising the steps of :
connecting a first collimator to a first optical fiber;
connecting a second collimator to a second optical fiber;
connecting a first length of coreless optical fiber to said first collimator;
connecting a second length of coreless optical fiber to said second collimator; and
forming said first and second lengths of coreless optical fiber into a prism.

13. (Currently amended) The method of claim 12 further comprising the steps of placing said first and second collimators in side-by-side abutment;
filling the valleys formed by said step of placing with an adhesive having a refractive index matched to the refractive index of said ~~first and second collimators~~ coreless optical fiber.

14. (Original) A fiber optic U-turn device, comprising:
a first collimator;
a first optical fiber connected to said first collimator;
a second collimator;
a second optical fiber connected to said second collimator;
a prism connected to a free end of said first collimator and a free end of said second collimator, said prism being formed from at least one section of coreless optical fiber.

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Original) A method for making a fiber optic U-turn device, comprising the steps of :
connecting a first collimator to a first optical fiber;
connecting a second collimator to a second optical fiber;
connecting a length of coreless optical fiber to said first and said second collimators; and
forming said length of coreless optical fiber into a prism.
19. (Currently amended) An apparatus comprising:
a prism;
a first optical fiber having a first end, said first end of said first optical fiber coupled to said prism;
a second optical fiber having a first end, said first end of said second optical fiber coupled to said prism; and
a substrate adapted to receive said first optical fiber, said second optical fiber and said prism in predetermined optical alignment with each other,
said substrate comprising at least a first ~~channel~~ groove; said first ~~channel~~ groove receiving at least one of said first optical fiber and said second optical fiber.
20. (Currently amended) The apparatus of claim 19, said first ~~channel~~ groove further receiving the other of said first optical fiber and said second optical fiber.
21. (Currently amended) The apparatus of claim 19, said substrate further comprising a second ~~channel~~ groove, said second ~~channel~~ groove receiving the other of said first optical fiber and said second optical fiber.
22. (Previously added) The apparatus of claim 19 further comprising a first collimator having a first end and a second end, said first end of said first collimator coupled to said prism and said second end of said first collimator coupled to said first end of said first optical fiber.

23. (Currently amended) The apparatus of claim 22, said first ~~channel~~ groove further receiving said first collimator.

24. (Currently amended) The apparatus of claim 22 further comprising a second collimator having a first end and a second end, said first end of said second collimator coupled to said prism and said second end of said second collimator coupled to said first end of said second optical fiber;

said first ~~channel~~ groove further receiving at least one of said first collimator and said second collimator.

25. (Previously added) The apparatus of claim 19 wherein said first optical fiber and said second optical fiber are in side-by-side abutment.

26. (Previously added) The apparatus of claim 19 wherein said substrate is a silicon v-groove chip.

27. (Previously added) The apparatus of claim 19 further comprising an index-matched material coupling at least one of said first and second optical fibers to said prism.

28. (Previously added) The apparatus of claim 27 wherein said index-matched material comprises an index-matched adhesive.

29. (Previously added) The apparatus of claim 19 further comprising:

a focusing lens coupled to said prism; and

a section of coreless optical fiber having a first end and a second end, said first end of said section of coreless optical fiber coupled to said focusing lens and second end of said section of coreless optical fiber coupled to said first end of said first optical fiber.

30. (Currently amended) The apparatus of claim 29, said first ~~channel~~ groove further receiving at least one of said focusing lens and said section of coreless fiber.

31. (Currently amended) A method for making a fiber optic U-turn device comprising a first optical fiber having a first end, a second optical fiber having a first end, a prism, and a substrate adapted to receive said first optical fiber, said second optical fiber and said prism in predetermined alignment with each other, said substrate comprising at least a first ~~channel~~ groove, said method comprising the steps of:

placing one of said first optical fiber and said second optical fiber into said first ~~channel~~ groove;

placing the other of said first optical fiber and said second optical fiber onto said substrate in predetermined alignment with said one of said first optical fiber and said second optical fiber;

positioning said prism onto said substrate in predetermined alignment with said first and second optical fibers;

optically coupling said first optical fiber with said prism; and

optically coupling said second optical fiber with said prism.

32. (Previously added) The method of claim 31 further comprising the steps of mechanically coupling said first optical fiber with said prism and mechanically coupling said second optical fiber with said prism.

33. (Previously added) The method of claim 31 further comprising the steps of:

coupling said first optical fiber to a first collimator;

coupling said first collimator to said prism;

coupling said second optical fiber to a second collimator; and

coupling said second collimator to said prism.

34. (Previously added) The method of claim 33 wherein said steps of connecting said first collimator to said prism and connecting said second collimator to said prism comprise using an index matched adhesive to bond said first and second collimators to said prism.

35. (Previously added) The method of claim 31 wherein said step of positioning said prism onto said substrate comprises molding from index-matched material said prism in-situ at a predetermined location of said substrate.

36. (Currently amended) The method of claim 31 wherein said step of placing the other of said first optical fiber and said second optical fiber onto said substrate comprises placing the other of said first optical fiber and said second optical fiber into said first ~~channel~~ groove.

37. (Currently amended) The method of claim 31 wherein said substrate further comprises a second ~~channel~~ groove and said step of placing the other of said first optical fiber and said second optical fiber onto said substrate comprises placing the other of said first optical fiber and said second optical fiber into said second ~~channel~~ groove.

38. (Currently amended) A method for making a fiber optic U-turn device comprising a first optical fiber having a first end, a first collimator having a first end and a second end, a second optical fiber having a first end, a second collimator having a first end and a second end, and a substrate comprising at least a first ~~channel~~ groove said method comprising the steps of:

preparing a first subassembly by connecting said first end of said first optical fiber to said first end of said first collimator;

preparing a second subassembly by connecting said first end of said second optical fiber to said first end of said second collimator;

connecting said second end of said first collimator to a first section of coreless optical fiber;

connecting said second end of said second collimator to a second section of coreless optical fiber;

joining said first section of coreless optical fiber to said second section of coreless optical fiber; and

forming said first and second sections of coreless optical fiber into a prism.

39. (Previously added) The apparatus of claim 38 further comprising the steps of:
placing one of said first subassembly and said second subassembly into said first channel;
placing the other of said first subassembly and said second subassembly onto said substrate
in predetermined alignment with one of said first subassembly and said second subassembly;
40. (Previously added) The apparatus of claim 38 further comprising the steps of:
placing said first and second collimators in side-by-side abutment; and
filling the valleys thus formed with an adhesive having a refractive index matched to the
refractive index of said first and second collimators.
41. (New) The method of claim 10 wherein said substrate comprises at least one groove and
wherein the step of placing said first collimator onto said substrate comprises placing said first
collimator into said groove.
42. (New) The apparatus of claim 1 wherein both of said first collimator and said second
collimator are received in said groove.
43. (New) The apparatus of claim 1 wherein said substrate further comprises a second
groove, wherein the other of said first collimator and said second collimator are received in said
second groove.
44. (New) The apparatus of claim 5 wherein said index-matched material comprises a sol-gel.
45. (New) The method of claim 9 wherein said index matched adhesive comprises a sol-gel.